

SEQUENCE LISTING

<110> Napier, Johnathan A.

<120> Polyunsaturated Fatty Acid (PUFA) Elongase from *Caenorhabditis elegans*

<130> 76/7

<140> PCT/GB00/01035

<141> 2000-03-20

<160> 22

<170> PatentIn Ver. 2.1

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<213> *C. elegans*

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<213> *C. elegans*

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aaaactgaat acaagttcc ttgtcaacaa tccgtagcca atttgtatct cgcattcgtc 780
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tacaaggatc acactgcattc aggacggtgg ttcatgttgc tgaattatgg agttcatgct 660
ctttagtatt cctactatgc tcttcgttct ctgaaattcc gtcttccaaa acaaatggca 720
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tgctttggag tttatccac atatccctt ctccgcac acttcttcta ccatgcata 900  
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gttttaattt acctgagaaa aaaggttca agaaaatcga aaaatcgca atgtcagaa 1020  
aataattata aaattcaatt ttcatcaat tttgttaatg ttgatggaaa aaaacataag 1080  
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<213> C. elegans

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attggttatc tcgtcaccat ctacttcggg caaaaattaa tggctcacag aaaaccatc 180  
gatctccaaa atacacttgc tctctggAAC ttcgggttt cactgttctc gggaaatcgcc 240  
gcctataagc ttatccaga actattcggg gtttcatga aggacgggtt tgcgttcc 300  
tactgtcaaa acgagaacta ctacaccgt gcatcaactg gattctgggg ctggccctt 360  
gtgatgtcga aagctccaga actagggat actatgttct tggctcttcg taaaaaacca 420  
gttatcttca tgcactggta tcatcatgcc ctacatttgc tctacgcagt agtacacatac 480  
tctgagcatc aggcatgggc tcgttggctt ttggctctca accttgcctg ccacactgtt 540  
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cacacctattt cccatgtctc tgagtttac actgacagta cctctggata ttggatctt 360  
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atctcttgc tgcgttgcgtt cgaaaaacttc tactatcaat catacatcaa gggaggtggc 780
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gaattgtgga gtcttttaac gaatcaggat gaagttttcc cgcatattag agcacggcga 180
ttcattcaag aacattttgg tctattcgctc cagatggcaa ttgcataatgt cattttggtg 240
ttctcaatca aaagggttcat gagggatcgta gaaccatttc aactcaccac agctttcg 300
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cttccgagtc aagcagaata ttggcttttc ctgacgatct tgtccaaagc tgtggagtt 480
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caattcatgt gctttatcta tggatgtact ctcatgtact actcggttgc cactaatcag 780
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<213> *C. elegans*

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cttttactag catggAACCGG tttttggca gtgttcagta ttatgggtac atggagattt 240
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35 40 45

Gln Lys Tyr Trp Tyr His Ser Ile Thr Ile Ser Val Leu Tyr Phe Ile  
 50 55 60

Leu Ile Lys Val Ile Gln Lys Phe Met Glu Asn Arg Lys Pro Phe Thr  
 65 70 75 80  
 Leu Lys Tyr Pro Leu Ile Leu Trp Asn Gly Ala Leu Ala Ala Phe Ser  
 85 90 95  
 Ile Ile Ala Thr Leu Arg Phe Ser Ile Asp Pro Leu Arg Ser Leu Tyr  
 100 105 110  
 Ala Glu Gly Phe Tyr Lys Thr Leu Cys Tyr Ser Cys Asn Pro Thr Asp  
 115 120 125  
 Val Ala Ala Phe Trp Ser Phe Ala Phe Ala Leu Ser Lys Ile Val Glu  
 130 135 140  
 Leu Gly Asp Thr Met Phe Ile Ile Leu Arg Lys Arg Pro Leu Ile Phe  
 145 150 155 160  
 Leu His Tyr Tyr His His Ala Ala Val Leu Ile Tyr Thr Val His Ser  
 165 170 175  
 Gly Ala Glu His Thr Ala Ala Gly Arg Phe Tyr Ile Leu Met Asn Tyr  
 180 185 190  
 Phe Ala His Ser Leu Met Tyr Thr Tyr Tyr Thr Val Ser Ala Met Gly  
 195 200 205  
 Tyr Arg Leu Pro Lys Trp Val Ser Met Thr Val Thr Thr Val Gln Thr  
 210 215 220  
 Thr Gln Met Leu Ala Gly Val Gly Ile Thr Trp Met Val Tyr Lys Val  
 225 230 235 240  
 Lys Thr Glu Tyr Lys Leu Pro Cys Gln Gln Ser Val Ala Asn Leu Tyr  
 245 250 255  
 Leu Ala Phe Val Ile Tyr Val Thr Phe Ala Ile Leu Phe Ile Gln Phe  
 260 265 270  
 Phe Val Lys Ala Tyr Ile Ile Lys Ser Ser Lys Lys Ser Lys Ser Val  
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 Lys Asn Glu  
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 <212> PRT  
 <213> C. elegans

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 35 40 45

Val Ala Val Ile Phe Thr Gly Lys Lys Val Val Leu Ile Tyr Lys Lys  
 50 55 60

Ser Arg Val Ile Thr Phe Glu Ser Ser Leu Gln Asn Ala Ile Lys Asn  
 65 70 75 80

Arg Asn Arg Lys Ser Leu Asn Ser Ser Gln Met Phe Gln Ile Met Glu  
 85 90 95

Lys Tyr Lys Pro Phe Gln Leu Asp Thr Pro Leu Phe Val Trp Asn Ser  
 100 105 110

Phe Leu Ala Ile Phe Ser Ile Leu Gly Phe Leu Arg Met Thr Pro Glu  
 115 120 125

Phe Val Trp Ser Trp Ser Ala Glu Gly Asn Ser Phe Lys Tyr Ser Ile  
 130 135 140

Cys His Ser Ser Tyr Ala Gln Gly Val Thr Gly Phe Trp Thr Glu Gln  
 145 150 155 160

Phe Ala Met Ser Lys Leu Phe Glu Leu Ile Asp Thr Ile Phe Ile Val  
 165 170 175

Leu Arg Lys Arg Pro Leu Ile Phe Leu His Trp Tyr His His Val Thr  
 180 185 190

Val Met Ile Tyr Thr Trp His Ala Tyr Lys Asp His Thr Ala Ser Gly  
 195 200 205

Arg Trp Phe Ile Trp Met Asn Tyr Gly Val His Ala Leu Met Tyr Ser  
 210 215 220

Tyr Tyr Ala Leu Arg Ser Leu Lys Phe Arg Leu Pro Lys Gln Met Ala  
 225 230 235 240

Met Val Val Thr Thr Leu Gln Leu Ala Gln Met Val Met Gly Val Ile  
 245 250 255

Ile Gly Val Thr Val Tyr Arg Ile Lys Ser Ser Gly Glu Tyr Cys Gln  
 260 265 270

Gln Thr Trp Asp Asn Leu Gly Leu Cys Phe Gly Val Tyr Phe Thr Tyr  
 275 280 285

Phe Leu Leu Phe Ala Asn Phe Phe Tyr His Ala Tyr Val Lys Lys Asn  
 290 295 300

Asn	Arg	Thr	Val	Asn	Tyr	Glu	Asn	Asn	Ser	Lys	Asn	Phe	Pro	Asp	Leu
305					310					315					320

Val Leu Ile Tyr Leu Arg Lys Lys Val Ser Arg Lys Ser Lys Asn Arg  
325 330 335

Gln Cys Ser Glu Asn Asn Tyr Lys Ile Gln Phe Ser Ser Asn Phe Val  
 340 345 350

Asn	Val	Asp	Gly	Lys	Lys	His	Lys	Lys	Thr	Tyr	Glu	Leu	Ile	Leu	Pro
355							360								365

Arg Arg Lys Met Thr Thr Ile Leu Thr Phe Leu Phe Gly Lys Asn Arg  
 370 375 380

Ile Phe Ser Lys Tyr Gln Lys Asn Arg Lys Asn Ile Ser Ile Pro Val  
 385                   390                   395                   400

Asp Phe Glu Ile Leu Glu Pro Lys Glu Asp Ile Asn Ala Asn Ile Ala  
405 410 415

Glu Pro Ser Ile Thr Thr Arg Ser Ala Ala Ala Arg Arg Lys Val Gln  
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Lys Ala Asp  
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<212> PRT  
<213> *C. elegans*

<400> 17

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20 25 30

Val Pro Leu Ser Tyr Lys Ile Met Ile Gly Tyr Leu Val Thr Ile Tyr  
35 40 45

Phe Gly Gln Lys Leu Met Ala His Arg Lys Pro Phe Asp Leu Gln Asn  
50 55 60

Thr Leu Ala Leu Trp Asn Phe Gly Phe Ser Leu Phe Ser Gly Ile Ala  
65 70 75 80

Ala Tyr Lys Leu Ile Pro Glu Leu Phe Gly Val Phe Met Lys Asp Gly  
85 90 95

Phe Val Ala Ser Tyr Cys Gln Asn Glu Asn Tyr Tyr Thr Asp Ala Ser  
                  100                 105                 110

Thr Gly Phe Trp Gly Trp Ala Phe Val Met Ser Lys Ala Pro Glu Leu  
 115 120 125

Gly Asp Thr Met Phe Leu Val Leu Arg Lys Lys Pro Val Ile Phe Met  
 130 135 140

His Trp Tyr His His Ala Leu Thr Phe Val Tyr Ala Val Val Thr Tyr  
 145 150 155 160

Ser Glu His Gln Ala Trp Ala Arg Trp Ser Leu Ala Leu Asn Leu Ala  
 165 170 175

Val His Thr Val Met Tyr Phe Tyr Phe Ala Val Arg Ala Leu Asn Ile  
 180 185 190

Gln Thr Pro Arg Pro Val Ala Lys Phe Ile Thr Thr Ile Gln Ile Val  
 195 200 205

Gln Phe Val Ile Ser Cys Tyr Ile Phe Gly His Leu Val Phe Ile Lys  
 210 215 220

Ser Ala Asp Ser Val Pro Gly Cys Ala Val Ser Trp Asn Val Leu Ser  
 225 230 235 240

Ile Gly Gly Leu Met Tyr Ile Ser Tyr Leu Phe Leu Phe Ala Lys Phe  
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Phe Tyr Lys Ala Tyr Ile Gln Lys Arg Ser Pro Thr Lys Thr Ser Lys  
 260 265 270

Gln Glu

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<210> 18
<211> 286
<212> PRT
<213> C. elegans

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Gly Leu Glu Gly Phe Ser Ala Lys Leu Ala Val Gly Tyr Ile Ala Thr
35 40 45
Ile Phe Gly Leu Lys Tyr Tyr Met Lys Asp Arg Lys Ala Phe Asp Leu
50 55 60
Ser Thr Pro Leu Asn Ile Trp Asn Gly Ile Leu Ser Thr Phe Ser Leu

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65	70	75	80
Leu Gly Phe Leu Phe Thr Phe Pro Thr Leu Leu Ser Val Ile Arg Lys			
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Asp Gly Phe Ser His Thr Tyr Ser His Val Ser Glu Leu Tyr Thr Asp			
100	105		110
Ser Thr Ser Gly Tyr Trp Ile Phe Leu Trp Val Ile Ser Lys Ile Pro			
115	120		125
Glu Leu Leu Asp Thr Val Phe Ile Val Leu Arg Lys Arg Pro Leu Ile			
130	135		140
Phe Met His Trp Tyr His His Ala Leu Thr Gly Tyr Tyr Ala Leu Val			
145	150		155
Cys Tyr His Glu Asp Ala Val His Met Val Trp Val Val Trp Met Asn			
165	170		175
Tyr Ile Ile His Ala Phe Met Tyr Gly Tyr Tyr Leu Leu Lys Ser Leu			
180	185		190
Lys Val Pro Ile Pro Pro Ser Val Ala Gln Ala Ile Thr Thr Ser Gln			
195	200		205
Met Val Gln Phe Ala Val Ala Ile Phe Ala Gln Val His Val Ser Tyr			
210	215		220
Lys His Tyr Val Glu Gly Val Glu Gly Leu Ala Tyr Ser Phe Arg Gly			
225	230		240
Thr Ala Ile Gly Phe Phe Met Leu Thr Thr Tyr Phe Tyr Leu Trp Ile			
245	250		255
Gln Phe Tyr Lys Glu His Tyr Leu Lys Asn Gly Gly Lys Tyr Asn			
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Leu Ala Lys Asp Gln Ala Lys Thr Gln Thr Lys Lys Ala Asn			
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<210> 19  
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<212> PRT  
<213> *C. elegans*

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Phe Ser His Glu Leu Ser Lys Lys His Ile Ala Gln Thr Gln Tyr Ala
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 35 40 45  
 Ala Val Met Thr Asn Arg Lys Pro Phe Asp Leu Thr Gly Pro Leu Asn  
 50 55 60  
 Leu Trp Asn Ala Gly Leu Ala Ile Phe Ser Thr Leu Gly Ser Leu Ala  
 65 70 75 80  
 Thr Thr Phe Gly Leu Leu His Glu Phe Phe Ser Arg Gly Phe Phe Glu  
 85 90 95  
 Ser Tyr Ile His Ile Gly Asp Phe Tyr Asn Gly Leu Ser Gly Met Phe  
 100 105 110  
 Thr Trp Leu Phe Val Leu Ser Lys Val Ala Glu Phe Gly Asp Thr Leu  
 115 120 125  
 Phe Ile Ile Leu Arg Lys Lys Pro Leu Met Phe Leu His Trp Tyr His  
 130 135 140  
 His Val Leu Thr Met Asn Tyr Ala Phe Met Ser Phe Glu Ala Asn Leu  
 145 150 155 160  
 Gly Phe Asn Thr Trp Ile Thr Trp Met Asn Phe Ser Val His Ser Ile  
 165 170 175  
 Met Tyr Gly Tyr Tyr Met Leu Arg Ser Phe Gly Val Lys Val Pro Ala  
 180 185 190  
 Trp Ile Ala Lys Asn Ile Thr Thr Met Gln Ile Leu Gln Phe Val Ile  
 195 200 205  
 Thr His Phe Ile Leu Phe His Val Gly Tyr Leu Ala Val Thr Gly Gln  
 210 215 220  
 Ser Val Asp Ser Thr Pro Gly Tyr Trp Phe Cys Leu Leu Met Glu  
 225 230 235 240  
 Ile Ser Tyr Val Val Leu Phe Gly Asn Phe Tyr Tyr Gln Ser Tyr Ile  
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 <213> C. elegans

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 35 40 45  
  
 Gln Asp Glu Val Phe Pro His Ile Arg Ala Arg Arg Phe Ile Gln Glu  
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 His Phe Gly Leu Phe Val Gln Met Ala Ile Ala Tyr Val Ile Leu Val  
 65 70 75 80  
  
 Phe Ser Ile Lys Arg Phe Met Arg Asp Arg Glu Pro Phe Gln Leu Thr  
 85 90 95  
  
 Thr Ala Leu Arg Leu Trp Asn Phe Phe Leu Ser Val Phe Ser Ile Tyr  
 100 105 110  
  
 Gly Ser Trp Thr Met Phe Pro Phe Met Val Gln Gln Ile Arg Leu Tyr  
 115 120 125  
  
 Gly Leu Tyr Gly Cys Gly Cys Glu Ala Leu Ser Asn Leu Pro Ser Gln  
 130 135 140  
  
 Ala Glu Tyr Trp Leu Phe Leu Thr Ile Leu Ser Lys Ala Val Glu Phe  
 145 150 155 160  
  
 Val Asp Thr Phe Phe Leu Val Leu Arg Lys Lys Pro Leu Ile Phe Leu  
 165 170 175  
  
 His Trp Tyr His His Met Ala Thr Phe Val Phe Phe Cys Ser Asn Tyr  
 180 185 190  
  
 Pro Thr Pro Ser Ser Gln Ser Arg Val Gly Val Ile Val Asn Leu Phe  
 195 200 205  
  
 Val His Ala Phe Met Tyr Pro Tyr Tyr Phe Thr Arg Ser Met Asn Ile  
 210 215 220  
  
 Lys Val Pro Ala Lys Ile Ser Met Ala Val Thr Val Leu Gln Leu Thr  
 225 230 235 240  
  
 Gln Phe Met Cys Phe Ile Tyr Gly Cys Thr Leu Met Tyr Tyr Ser Leu  
 245 250 255  
  
 Ala Thr Asn Gln Ala Arg Tyr Pro Ser Asn Thr Pro Ala Thr Leu Gln  
 260 265 270  
  
 Cys Leu Ser Tyr Thr Leu His Leu Leu  
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Asp Ala Glu Gly Arg Lys Phe Phe Ala Asp His Phe Asp Val Thr Ile  
35 40 45  
Gln Ala Ser Ile Leu Tyr Met Val Val Val Phe Gly Thr Lys Trp Phe  
50 55 60  
Met Arg Asn Arg Gln Pro Phe Gln Leu Thr Ile Pro Leu Asn Ile Trp  
65 70 75 80  
Asn Phe Ile Leu Ala Ala Phe Ser Ile Ala Gly Ala Val Lys Met Thr  
85 90 95  
Pro Glu Phe Phe Gly Thr Ile Ala Asn Lys Gly Ile Val Ala Ser Tyr  
100 105 110  
Cys Lys Val Phe Asp Phe Thr Lys Gly Glu Asn Gly Tyr Trp Val Trp  
115 120 125  
Leu Phe Met Ala Ser Lys Leu Phe Glu Leu Val Asp Thr Ile Phe Leu  
130 135 140  
Val Leu Arg Lys Arg Pro Leu Met Phe Leu His Trp Tyr His His Ile  
145 150 155 160  
Leu Thr Met Ile Tyr Ala Trp Tyr Ser His Pro Leu Thr Pro Gly Phe  
165 170 175  
Asn Arg Tyr Gly Ile Tyr Leu Asn Phe Val Val His Ala Phe Met Tyr  
180 185 190  
Ser Tyr Tyr Phe Leu Arg Ser Met Lys Ile Arg Val Pro Gly Phe Ile  
195 200 205  
Ala Gln Ala Ile Thr Ser Leu Gln Ile Val Gln Phe Ile Ile Ser Cys  
210 215 220  
Ala Val Leu Ala His Leu Gly Tyr Leu Met His Phe Thr Asn Ala Asn  
225 230 235 240  
Cys Asp Phe Glu Pro Ser Val Phe Lys Leu Ala Val Phe Met Asp Thr  
245 250 255

Thr Tyr Leu Ala Leu Phe Val Asn Phe Phe Leu Gln Ser Tyr Val Leu  
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Arg Gly Gly Lys Asp Lys Tyr Lys Ala Val Pro Lys Lys Lys Asn Asn  
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Glu Thr Ile Ile Tyr Ser Pro Phe Glu Tyr Asp Ser Thr Leu Leu Ile  
20 25 30

Glu Ser Cys Arg Cys Thr Tyr Gln Leu Leu Ile Leu Arg Gln Ile  
35 40 45

Tyr Tyr Arg Asp Ile Trp Ser His Gly Asn Leu Lys Ala Cys Asp Xaa  
50 55 60

Leu Leu Leu Ala Trp Asn Gly Phe Leu Ala Val Phe Ser Ile Met Gly  
65 70 75 80

Thr Trp Arg Phe Gly Ile Glu Phe Tyr Asp Ala Val Phe Arg Xaa Gly  
85 90 95

Phe Ile Xaa Ser Ile Cys Leu Ala Val Asn Pro Arg Ser Pro Ser Ala  
100 105 110

Phe Trp Ala Cys Met Phe Ala Leu Ser Lys Ile Ala Glu Phe Gly Asp  
115 120 125

Thr Met Phe Leu Val Leu Arg Lys Arg Pro Val Ile Phe Leu His Trp  
130 135 140

Tyr His His Ala Val Val Leu Ile Leu Ser Trp His Ala Ala Ile Glu  
145 150 155 160

Leu Thr Ala Pro Gly Arg Trp Phe Ile Phe Met Asn Tyr Leu Val His  
165 170 175

Ser	Ile	Met	Tyr	Thr	Tyr	Tyr	Ala	Ile	Thr	Ser	Ile	Gly	Tyr	Arg	Xaa			
														180	185	190		
Pro	Lys	Ile	Val	Ser	Met	Thr	Val	Thr	Phe	Leu	Gln	Thr	Leu	Gln	Met			
															195	200	205	
Leu	Ile	Gly	Val	Ser	Ile	Ser	Cys	Ile	Val	Leu	Tyr	Leu	Lys	Leu	Asn			
															210	215	220	
Gly	Glu	Met	Cys	Gln	Gln	Ser	Tyr	Asp	Asn	Leu	Ala	Leu	Ser	Phe	Gly			
															225	230	235	240
Ile	Tyr	Ala	Ser	Phe	Leu	Val	Leu	Ser	Ser	Phe	Phe	Asn	Asn	Ala	Tyr			
															245	250	255	
Leu	Val	Lys	Lys	Asp	Lys	Lys	Pro	Asp	Val	Lys	Lys	Asp						
															260	265		